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East Germany

REPORT

SUBJECT

Work in Experimental Physics at
Halle University (Institut fuer
Experimentelle Physik, Quarterly
Reports)

DATE DISTR.

21 March 1955

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NO. OF PAGES 3

DATE OF INFO.

REQUIREMENT NO.

RD

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PLACE ACQUIRED

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DATE ACQUIRED

THE SOURCE EVALUATIONS IN THIS REPORT ARE DEFINITIVE.
THE APPRAISAL OF CONTENT IS TENTATIVE.
(FOR KEY SEE REVERSE)

1. Internal focussing X-ray tubes

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a. Working plan:

- (1) Construction of an X-ray-microscopic tube for electrostatic operations.
- (2) Construction of a motion-picture camera.
- (3) Continuation of research on production of aluminum single crystals.

b. Implementations:

- (1) To a (1): The construction of the revolving anode part was completed; thus workshop operations can be started. Most of the construction drawings were completed.
- (2) To a (2): The construction of a camera for single photographs was completed; thus the motion-picture research using the older open X-ray tube can be continued.
- (3) To a (3): Experiments dealing with the growing of aluminum single crystals through recrystallization and smelting are being carried out.
- (4) Furthermore, the additional construction of a ball-shaped monochromometer made of polycrystalline copper is in preparation.

2. Debye-effect-ionic masses

a. Working plans: Further developmental work, improvements of apparatus and continuation of research.

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(Note: Washington distribution indicated by "X"; Field distribution by "#".)

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b. Implementation:

- (1) The developmental work on the large apparatus, retarded through delays in deliveries, is continuing. The following parts of the impulse-controlled high-frequency generators are in the state of construction:
 - power stage with power supply;
 - impulse generator with a pulse ration 1:10 and 1:1;
 - oscillator stage (ECO-switching);
 - sound transmitter (Schallgeber);
 - high-frequency receiver with amplifier.
- (2) All construction parts will be fitted in a uniform case compactly. Lack of space is still hampering the entire work.
- (3) The delivered transformer sheets do not always measure up to requirements.
- (4) The oscillator with a 100 watt final stage-built from developed parts was constructed as self-contained apparatus which proved successful in the operations of Bari 03 vibrators.

3. Electron optics

a. Working plan:

- (1) Construction of an experimental apparatus; application of electron optics to problems of the structure of materials (Realbau).
- (2) Assessment and classification of results on electron microscope work.

b. Implementation:

- (1) To a (1): The construction of an experimental apparatus for the purpose of the development of an universal electron source is progressing further. The construction of a transmitter for the supply of a newly to be developed high-voltage installation had been completed.
- (2) To a (2): The assessment and the classification of the results on electron microscope work in relation to the questions of the structure of crystals was concluded.

4. Ultrasonics-high pressure-interferometer

a. Working plan: Continuation of experiments.

- b. Implementation: The velocity of sound in carbonic acid near the critical point at a frequency of 410 kilocycles per second is measured by an ultrasonic high pressure interferometer. Large differences were discovered in comparison to standards of value found by other scientists (making experiments) with different frequencies by the use of the well-known pvt-diagrams—that velocity of sound which corresponds to the medium null frequency. These differences cannot be traced back to a dispersion. A dispersion as a consequence of a structure relaxation with a molecular formation could only be expected very near the critical point. The discrepancies in the standards of value found here, in comparison to those standards of value given in scientific literature, and the fact that many scientific works differ in the evaluation of these standards cannot be explained. The specific heat will be determined through sound velocity experiments with the aid of the pvt-diagram. This scientific method is more accurate than the experiments which use only the pvt-diagram.

5. Experimental examination of Piezo transducers

a. Working plan: Improvement of apparatus and tests.

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b. **Implementation:** The work on the project--the directive for its start was given last year--to determine the electrostriction-coefficients and the residual polarization of barium-titanate-ceramics resulting from change of thickness and polarization is being continued. The apparatus was improved to that extent that the changes of thickness of transducers consisting of quartz which amounted to about $3 \cdot 10^{-7}$ in Kveff can now be measured to less than 10%. Certain difficulties arose, however, during the examinations and tests on barium-titanate. Presumably very much will depend on the quality of electrodes. Some instruments and equipment are needed in order to examine the attenuation of the Piezo-transducers. Unfortunately the Planning Commission has not reached a decision concerning the acquisition of the suggested admittance measuring apparatus (Scheinleitwertmessplatz) which possibly might render superfluous some developmental work. Subsequently, in the supplemental second quarter plan, the acquisition of this apparatus was approved.

6. Atmospheric static

a. **Working plan:**

- (1) Completion of a visual indicator.
- (2) Construction of a new photographic adapter and reconstruction of the old recording camera.
- (3) Construction and installation of a screened direction-finder antenna for 49 kilocycles per second with inclusion of the adjusting links belonging to it.
- (4) Electric improvement of the Gaslabor. completed and

b. **Implementation:**

- (1) To a (1) and (2): Construction has been completed and working operations can start.
- (2) To a (3): Construction has been completed; the installation is being prepared.
- (3) To a (4): The installation of the transmission lines and of the switchboard and the equipment for the emergency power supply were completed.

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